

METHOD AND APPARATUS FOR DISTRIBUTING WATER IN AN
ARRAY OF FUEL CELL STACKS

Abstract

A method and apparatus are provided for distributing water produced by the electrochemical reaction to ion-exchange membranes in an array comprising a plurality of 5 electrochemical fuel cell stacks. Water distribution within individual fuel cell stacks within the array is improved to reduce membrane dryness near the oxidant stream inlet and to also reduce saturation of the oxidant stream near the 10 oxidant stream outlet, thereby reducing electrode flooding. The method comprises periodically reversing the oxidant stream flow direction within at least one of the plurality of fuel cell stacks. The apparatus comprises an oxidant stream 15 flow switching device for periodically switching the flow direction of an oxidant stream through an individual fuel cell stack. In one embodiment the apparatus further comprises a water recycler for capturing water from the oxidant exhaust 20 stream and returning the captured water to the oxidant stream when the flow direction is reversed. In a preferred embodiment, the oxidant stream flow direction in an array of fuel cell stacks is controlled to stagger the oxidant flow 25 reversals for individual stacks to reduce fluctuations in power output.